REMARKS

The Office Action dated August 20, 2008 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1-2, 5-11, 14-25, and 27-28 are currently pending, including independent claims 1, 10, 19, 25, and 27-28. Applicants here cancelled claim 26 without prejudice or disclaimer and amended claims 1, 10, 25, and 28 to particularly point out and distinctly claim the subject matter which the Applicants regards as the invention. Applicants urge that all grounds for rejection in the Office Action have been addressed and that the present application is currently in condition for allowance in view of the claim amendments, and the following explanations. Therefore, reconsideration of claims 1-2, 5-11, 14-25, and 27-28 are respectfully requested.

Rejection under 35 U.S.C. §112, Second Paragraph

Referring to the Office Action, claim 28 was rejected under 35 U.S.C. §112, second paragraph as being allegedly indefinite because the claim is directed to a system with coverage and capacity layers but does not recite any elements components for achieving the layers. To address this rejection, Applicants here amend claim 28 to recite coverage layer carriers to provide the coverage layer and capacity layer carriers to provide the capacity layer. Applicants urge that this rejection is therefore moot in view of the present amendments and should be withdrawn.

Rejection under 35 U.S.C. §112, Second Paragraph

The Office Action rejected claims 1-28 under 35 U.S.C. §112, first paragraph because the limitation of "varying the total capacity" is allegedly not disclosed in the specification to enable on of ordinary skill in the field of communication to implement these claims. As an initial note, this rejection improperly refers to prior cancelled claims 3-4 and 12-13. As described below, Applicants further urge that the rejection is improper because the claims are fully supported by the specification.

For example, paragraph [0027] of the present specification states that carriers can be added or removed from the cell, thereby varying the capacity of the cell. Paragraph [0031] discloses that "the coverage of certain carriers may be limited, in order to accommodate more carriers in the network." Paragraph [0033] disclosed that the capacity of the cell can be dynamically adjusted, and paragraph [0034] disclosed that the CCR parameters can be easily mapped to a table which can be utilized dynamically for the network. Paragraph [0036] states that the third column of the table lists the total capacity, *i.e.*, the number of carriers in the cell for various arrangements. Paragraph [0063] further provides that the multicarrier system can dynamically change the number of carriers. Paragraph [0078] states that the radio resource management can dynamically change the CCR parameters of the cell.

Therefore, Applicants urge that the specification provides amble support for the varying the total capacity by varying the number carriers in a cell. From these and other sections of the description, it would be clear to a person of ordinary skill in the relevant technical fields that various recited embodiments of the present invention allow for the

total capacity of the cell to be dynamically varied. Accordingly, withdrawal of this rejection and reconsideration of the pending claims are respectfully requested.

The Office Action also rejected software-type claim 26 as being unsupported by the specification. Applicants believe that this rejection is improper since the specification discloses hardware elements in a base station that, according relevant technical standards, can (an likely most) include a computer-readable storage device and software elements. Nevertheless, Applicants here cancel claim 26 to expedite examination and allowance of the remaining claims.

Rejection under 35 U.S.C. 103(a)

Claims 1-2, 21, 23, and 24-28 were rejected under 35 U.S.C. §103(a) as being allegedly obvious in view of U.S. Patent No. 6,128,328 (Schilling) in combination with U.S. Patent No. 5,889,494 (Reudink). Referring, for example, to claim 1, the Office Action asserted that Schilling discloses all recitations of the these claims except that the number of carriers in the capacity layer is variable, and the Office Action further asserted that this deficiency is cured by Reudink.

In an initial observation, Applicants note that this rejection discusses claims 5-11 and 14-20, but did not reject these claims. Accordingly, Applicants note that Office Action failed to present a *prima facie* rejection, and claims 5-11 and 14-20 are presumably allowable. If these claims are subsequently rejected in a future Action, this rejection must be "non-final" since the rejection would not be necessitated by an amendment to these claims (or an intervening information disclosure statement).

However, as described below, the combination of Schilling and Reudink fails to disclose each and every limitation in any of the pending claims.

Independent claim 1, from which claims 2, 5-9, and 23 depend, relates to an apparatus comprising a defining unit. The defining unit is configured to define a capacity layer for a cell of a communications system. The cell includes a coverage layer having a fixed coverage area provided by at least one carrier, and the capacity layer includes at least one carrier. Each carrier in the capacity layer has a dynamically variable coverage area, such that the number of carriers in the capacity layer is variable, to thereby dynamically vary the total capacity of the cell.

Independent claim 10, from which claims 11, 14-18, and 24 depend, relates to a method that includes defining a capacity layer for a cell of a communications system. This cell includes a coverage layer having a fixed coverage area provided by at least one carrier, and the capacity layer includes at least one carrier. Each carrier in the capacity layer has a dynamically variable coverage area, such that the number of carriers in the capacity layer is variable, to thereby dynamically vary the total capacity of the cell.

Independent claim 19, from which claims 20-22 depend, relates to an apparatus that includes at least one transmitter configured to transmit a first carrier at a predetermined power level. The transmitter thereby defines a fixed coverage area of a cell of a communications system. The transmitter is configured to transmit a variable number of further carriers thereby defining, at least in part, a dynamically variable total capacity of the cell, such that each of the further carriers has a dynamically variable coverage area.

Independent claim 25 relates to an apparatus that includes means for defining a capacity layer for a cell of a communications system, the cell comprising a coverage layer having a fixed coverage area provided by at least one carrier, the capacity layer comprising at least one carrier. Each carrier in the capacity layer has a dynamically variable coverage area, such that the number of carriers in the capacity layer is variable, to thereby dynamically vary the total capacity of the cell.

Independent claim 27 relates to an apparatus that includes means for transmitting a first carrier at a predetermined power level thereby defining a fixed coverage area of a cell of a communications system. The apparatus also includes means for transmitting a variable number of further carriers, thereby defining, at least in part, a dynamically variable total capacity of the cell, wherein each of the further carriers has a dynamically variable coverage area.

Independent claim 28 relates to a cellular communication system including at least one cell. The cell includes a coverage layer having a fixed coverage area provided by at least one carrier, and a capacity layer comprising at least one carrier. Each carrier in the capacity layer has a dynamically variable coverage area, wherein the number of carriers in the capacity layer is variable, to thereby dynamically vary the total capacity of the cell.

As described below, Applicants urge that the combination of Schilling and Reudink fails to disclose each and every limitation in any of the above-presented independent claims.

As described in the prior submission, certain recited embodiments of the present application provide significant technical benefits and are particularly useful in TDMA

systems, such as that described in the present application. The number of carriers in each cell can be dynamically varied so that at times when a large number of users wish to communicate with the base station, the number of carriers in the cell can be increased to accommodate the extra demand. However, at times when only a small number of users wish to communicate with the base station, the number of carriers in the cell can be reduced to decrease the power consumption in the cell and also the interference between cells. Hence, by dynamically varying the total capacity of the cell, the system can adapt to the current requirements of the system and therefore optimize the system. As described, for example, in paragraph [0112] of the specification this can lead to a cheaper radio network, no waste of resources, and efficient spectrum utilization. As described below, no such feature is disclosed or suggested in Schilling or Reudink.

As described below, Schilling changes the area covered by one cell with the idea to adjust the collected traffic to the capacity of the base station. Thus the traffic is spread evenly over the cells. In this way, the disclosure in Schilling relates to a type of shunting of subscribers from one cell to a neighboring cell. In this way, Schilling relates to dealing with how to collect user traffic effectively.

Specifically, as described in Applicants' prior submissions, Schilling discloses a CDMA cellular communication system including at least one cell. *See, for example,* elements A, B, C, in Figure 5. Each cell is split up into a number of different regions. Each region is assigned a frequency range (F1-F6) that is different to the frequency range assigned to its adjacent regions (See Figures 5 and 8). Each frequency range can accommodate a certain number of remote units communicating with the base station in

the CDMA system. For example in column 12, lines 59 to 64, it states that each frequency range could accommodate 80 remote units. If the number of units in a region exceeds 80, and the number of units in an adjacent region is below 80 then the region size should be adjustable to meet the demand.

Although each region in Schilling may adjust its size, Schilling discloses that the number of regions and the **total capacity of each region is fixed**. Therefore the capacity of each cell is fixed (i.e. the number of remote users that can be accommodated in each cell cannot vary). There is nothing in Schilling to suggest that the capacity of the cell could vary.

As described in Applicants' prior submission, Schilling does not disclose that the total capacity of the cell is dynamically varied, as recited in claim 1. The Office Action refers to Schilling at column 12, lines 58 to 65, which states that "for example, in Fig 6, a maximum of 80 remote units can be accommodated per sector. If 81 remote units appear in a sector and only, say, 75 remote units appear in an adjacent sector, the sector size should be adjustable to meet the demand." Applicant note that this section of Schilling describes that the size of the sectors making up the cell can be adjusted but not the number of sectors or the maximum number of remote units per sector. In the example described in column 12, lines 58 to 65 of Schilling, the maximum number of remote units that can be accommodated in each sector is 80. The number of sectors in the example of Fig 6 of Schilling is 6. Therefore the total capacity of the cell is 80*6 = 480 remote units. This total capacity is not dynamically varied Schilling, and the adjusting the sector size does not adjust the total capacity which is fixed (at 480 remote units in the example

described in Schilling on column 12, lines 58 to 65). It is therefore submitted that, contrary to the technical arguments in Office Action, Schilling does not disclose the feature "to dynamically vary the total capacity of the cell" as recited in claim 1.

Applicants therefore urge that, contrary to the assertions in the Office Action, Schilling does not disclose the recitations in claim 1 of "a fixed coverage area" or "dynamically varying the capacity of the cell." Instead, as described above, the coverage area in Schilling is variable and the total capacity is fixed. Furthermore, as conceded in the Office Action, Schilling also does not disclose the claimed "the number of carriers in the capacity layer is variable." For at least these reasons, Applicants note that Schilling by itself does not teach or suggest each and every limitation of claim 1.

Applicants further urge that Reudink does not cure these deficiencies in Schilling. Instead, Reudink discloses a system for dynamically sizing sectors of a multi-sectored radiation pattern. Multiple narrow beams are used and the number of narrow beam signals provided to inputs associated with a particular sector defines the azimuthal width of that sector. Thus, Reudink discloses dynamically shaping the cell through beam forming of the antenna pattern at each cell. In this way, Reudink also relates to collecting user traffic more effectively.

Referring now to the recitations of claim 1, Reudink therefore does not and cannot disclose "each carrier in the capacity layer having a dynamically variable coverage area." Moreover, Reudink further does not disclose "wherein the number of carriers in the capacity layer is variable, to thereby dynamically vary the capacity of the cell."

The Office Action refers to column 11, lines 23 to 38 of Reudink in an attempt to show the feature "wherein the number of carriers in the capacity layer is variable." However, Applicants urge that this section of Reudink merely states "sector controller 460 may adjust the splitter/switch matrixes of the present invention to provide alternative sector sizing and thus increase the number of channels, or other resources, available to a particular area within the cell, or improve signal quality associated with a sector or user." When more channels are provided to a particular area within a cell, these channels must be taken away from another area that has less user demand. The total number of channels within the cell is fixed, and in the examples given in Reudink, the total number of channels within a cell is fixed at 12.

Even if the cell 201 of Figure 2 of Reudink is considered to be a recited "cell" of claim 1 (not admitted), Applicants note that the coverage area of this cell is fixed, and that the number of carriers in the cell and, therefore, the total capacity of the cell are also fixed. Alternatively, if a sector of a cell such as 151 in Figure 1B could be considered a "cell" a recited "cell" of claim 1 (also not admitted), Applicants further note that the coverage area varies and the capacity of the "cell" varies as the number of narrow beams in the sector is changed, and this disclosure in Reudink teaches away from the express recitations of claim 1. Specifically, neither of these interpretations of Reudink, nor any proper reading of the reference, include the recited combination of features of embodiments of the present application in which the coverage area of the cell is fixed and the number of carriers in the capacity layer is variable to thereby dynamically vary the total capacity of the cell, as recited in Applicants' claim 1.

As described above, a number of narrow beam antennae are used in Reudink to provide dynamically shapable sectors within a cell. The narrow beams shown for example in Figure 2 are combined in different configurations to provide different configurations for the sectoring within the cell. For example, as depicted in Reudink at Figures 3A and 3B, two adjacent 60° sectors are provided such that two sectors are provided over 120°. This leaves one sector to cover the remaining 240° of the cell (Reudink at column 8, lines 40 to 66). In this way, the disclosure in Reudink can be used to dynamically distribute capacity within the cell, but the total capacity of the cell is fixed. Thus, Reudink teaches away from varying the total capacity of the cell, stating in column 2, lines 42 to 48 that "it would be advantageous to make more efficient use of cellular capacity by being able to make sectors dynamically shapable in order to provide increased capacity to a particular area within the cell's radiation pattern by making more channels potentially available to that particular area, without actually increasing the total number of channels within the cell" (emphasis added).

In summary, neither Reudink nor Schilling discloses the combination of features of a cell "comprising a coverage layer having a fixed coverage area provided by at least one carrier" and a capacity layer in which each carrier has "a dynamically variable coverage area wherein the number of carriers in the capacity layer is variable, to thereby dynamically vary the total capacity of the cell." This combination of features allows the present invention to maintain a fixed coverage area for the cell, whilst adapting to the capacity demand in real-time. This combination of features is not disclosed or suggested in either Schilling or Reudink, in combination or otherwise.

Paragraph [0112] of the present application gives some of the advantages of the present invention over the prior art system. For example, the combination of features recited in claim 1 has the advantage of providing a sophisticated capacity and coverage layer control providing the same network performance as the prior art systems with less resources, leading to a cheaper radio network, no waste of resources and efficient spectrum utilization. Embodiments of the present invention also allow more capacity to be added to the system without resulting in a reduction in the cell coverage. The total transmit power throughout the network can be reduced, reducing radio interference, as the number of carriers in the capacity layer can be dynamically reduced during quiet periods.

In summary, Applicants note that the combination of Schilling and Reudink fails to disclose each and every limitation of claim 1. For example, as described above neither Schilling nor Reudink discloses the features of claim 1 "wherein the number of carriers in the capacity layer is variable, **to thereby dynamically vary the capacity of the cell**." Instead, both of the cited references describe methods of resizing the sectors of the cell, not of varying the capacity of the cell.

It is therefore submitted by the Applicants that the combination of Schilling and Reudink does not disclose at least the above identified limitations of claim 1.

For at least these reasons, the combination of Schilling and Reudink is fails to disclose each and every limitation of claim, and claim 1 is therefore allowable over this combination of references. Similarly, claims 2, 4-9, and 23 that depend from claim 1 and

should be allowed similar grounds, as well as for the additional features recited in these dependent claims.

Likewise, pending independent claims 10 and 19, although different in scope and rejected on different basis, and new independent claims 25-28, contain similar limitations related dynamically varying the total capacity of the cell and are therefore allowable over the combination of Schilling and Reudink on similar grounds. Applicants further submit that because claims 11, 14-18, 20-21, and 24 depend from either claims 10 or 19, these claims are allowable at least for the same reasons as claims 10 and 19, as well as for the additional features recited in these dependent claims. Accordingly, withdrawal of this rejection under 35 U.S.C. 103(a) is respectfully requested.

Applicants further urge that the combination of Schilling and Reudink is legally improper under 35 U.S.C. §103(a). As depicted in Figures 5 and 8, Schilling discloses how a cell is split up into concentric regions in which distinct frequencies can be used. For example, Figure 8 of Schilling discloses that the sectors are arranged in a specific order to minimize the interference of adjacent cells. Adding a new carrier at a new frequency (*see, e.g.*, F7 in the terminology used in Figure 8 of Schilling) would disrupt the entire system, and Schilling contains no disclosure or suggestion regarding how the sectors of Figure 8 would accommodate this extra frequency. that it would not be obvious to the skilled person how to modify the sector arrangement shown in Figure 8 of Schilling to include such a feature. Therefore Schilling could not be combined with any document to disclose the combination of features as recited in claim 1 without significant additional development and undue experimentation.

Moreover, Reudink discloses equally spaced radial narrow beams are used (Figure 2) and these narrow beams are grouped to form radial sectors within the cells. Thus, the two cited references provide alternative, technically incompatible ways of splitting up the cells into sectors. These two cell division cannot be combined because the technical techniques are adverse, and there would be no reasonable expectation for technical success of the combination. Therefore this combination is legally improper. *See*, MPEP §2143. Accordingly, withdrawal of this rejection under 35 U.S.C. 103(a) is also respectfully requested on this legal ground.

Claim 22 was rejected under 35 U.S.C. §103(a) as being allegedly obvious over Schilling and Reudink in view of U.S. Patent Publication No. 2004/0203837 (Lawrence). In particular, the Office Action took the position that Schilling and Reudink disclosed all of the features of claim 22 except at least one transmitting unit is further configured to reduce power allocated to at least one carrier in response to an increase in the variable number of carriers. The Office Action then asserted that Lawrence disclosed this feature. Applicants respectfully submit that the cited references, taken individually or in combination, fail to disclose or suggest all of the features recited in claim 22. Specifically, Schilling and Reudink are deficient at least for the reasons discussed above, and Lawrence fails to cure these deficiencies.

As described in the prior submissions, Lawrence is directed to managing system control signaling to optimize spectrum and other system resources. Lawrence describes making available the spectrum normally occupied by the control channel to service channels (voice or data channels) when the control channel has no further service

channels to assign (i.e., all service channels are active). The capability for a control channel radio is defined for operating on a center frequency, assigning traffic to a second radio, supporting the delivery of voice and data, and operating on the same center frequency.

However, Applicants respectfully submit that Lawrence is silent with regards to varying the number of carriers in the capacity layer to dynamically vary the capacity of the cell, as recited in the presently claimed invention. Thus, Lawrence fails to cure the above-described significant deficiencies in Schilling and Reudink.

Based at least on the above, Applicants respectfully submit that the cited references fail to disclose or suggest all of the features recited in claim 22. Accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully requested.

Claims 1, 10, 19, and 25-28 were further rejected under 35 U.S.C. §103(a) as being allegedly obvious in view of U.S. Patent No. 6,128,328 (Schilling) in combination with U.S. Patent No. 6,950,678 (Mujtaba). Referring, for example, to claim 1, the Office Action asserted that Schilling discloses all recitations of the these claims except for varying the total capacity of the system, and that this deficiency is allegedly addressed in Mujtaba by increasing the number channels. However, as described below, the combination of Schilling and Mujtaba fails to disclose each and every limitation in any of the pending claims.

Schilling is discussed in detail above. As described, *infra,* each of claims 1, 10, 19, and 25, and 27-28 are allowable over Schilling.

As described below, Mujtaba does not cure these deficiencies in Schilling. Instead, Mujtaba generally discloses that the cell area including size, shape and, to some extent, the location of the center of the cell is adjusted to collect the right amount of traffic by the microcell. In this way, Mujtaba also focuses on how to collect user traffic effectively.

Specifically, Mujtaba generally discloses a control technique for a communication system in which a microcell base station is co-located with a macrocell base station. Microcells are established within overlying macrocells to handle areas with relatively dense concentrations of mobile users, referred to as "hot spots." The microcell base station tracks hot spots as they move within the macrocell. The size of the microcell coverage area depends upon the distance from the cell site antenna as well as the dimensionality of the antenna array. The microcell and the macrocell can be separated in frequency.

Mujtaba has no disclosure or suggestion of dynamically varying the total capacity of the cell as recited in claim 1. Instead, Mujtaba discloses a system in which the microcell may be steered to a desired location, namely a hot spot (column 3, lines 18 to 30 and Figure 3). But the total capacity of the cell is not dynamically varied by steering the microcell as described in Mujtaba.

Applicants therefore respectfully submit that Mujtaba does not disclose or suggest the ability to dynamically vary the capacity of the cell whilst keeping the coverage area of the cell fixed. As described above the same applies to Schilling and Reudink, and so it is submitted that none of the cited prior art documents, in combination or otherwise

disclose the combination of features currently found in claim 1 of "the cell comprising a coverage layer having a fixed coverage area provided by at least one carrier" and a capacity layer in which each carrier has "a dynamically variable coverage area wherein the number of carriers in the capacity layer is variable, to thereby dynamically vary the total capacity of the cell."

Furthermore, the Office Action at page 9 takes the position that Mujtaba inherently discloses increasing the total capacity of cell by increasing the number of channels and/or carriers. Applicants note that this rejection is defective on several grounds. As described above, Mujtaba does not teach or suggest adjusting total capacity. Furthermore, as described above, Mujtaba does not disclose or suggest dynamically adjusting the number of channels and carriers. Also, as noted in Mujtaba, there are multiple reasons to change the number of channels and carriers that are entirely unrelated to adjusting the total capacity. Therefore, it is not "capable of instant and unquestionable demonstration as being well-known" that disclosure in Mujtaba could be used to adjust the total capacity." See MPEP §2144.03.

As described above, the combination of features of claim 1 allows the coverage area of the cell to be fixed, and at the same time, the total capacity of the cell can be varied to match the current demand. Embodiments of the present invention can optimize the capacity of the cell without compromising the coverage area of the cell. The combination of features of claim 1 is not disclosed or suggested in any of the cited prior art documents, in combination or otherwise.

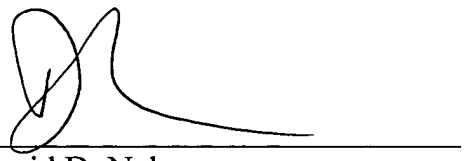
It is therefore submitted that claim 1 is novel and inventive over the cited prior art. Independent claims 10, 19, 25 and 27-28, although patentable distinct from claim 1, recites a similar limitation of dynamically varying the total capacity and are, therefore, novel and inventive over the cited prior art for the same reasons as those described above in relation to claim 1.

Applicants respectfully submit that each of claims 1-2, 5-12, and 14-25, and 27-28 recite features that are neither disclosed nor suggested in any of the cited references. Accordingly, it is respectfully requested that each of claims 1-2, 5-12, 14-25, and 27-28 be allowed, and this application be passed to issue.

If, for any reason, the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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